

#### GENERAL INFORMATION

The Norelco Model EL-3541 is a single-speed tape recorder and can play back both monaural and stereophonic recordings.

Recordings can be made from a microphone, radio, phonograph, tuner or TV set. An external amplifier and speaker may be connected to the recorder to play back stereo recordsings.

This model has a tape speed of 3 3/4 ips. Recording time will be as follows:

Tape Length

Time

1200 ft. 1800 ft. 2400 ft. 2 hours

3 hours 4 hours

Operate the recorder on 60 cycles, 110-115 or 220-240 volts AC only.

Supplied By:

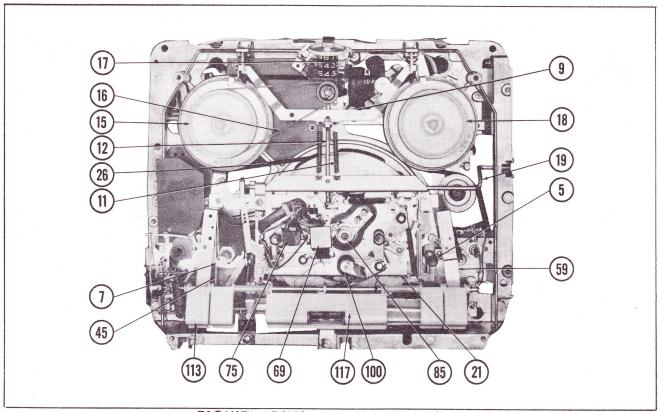
North American Philips Company, Inc. High Fidelity Products Division 230 Duffy Avenue Hicksville, L. I., New York

# HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana



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TOP VIEW OF MECHANISM (SEE PAGE 4 ALSO)

# FUNCTION OF CONTROLS, PUSH BUTTONS AND JACKS

# Power On-Off, Volume Control

Turns power on or off for the entire unit. Determines recording level when recording from radio or phono. Controls volume on playback.

#### Tone Control

Controls bass and treble response on playback. It does not function during record.

#### Microphone Volume Control

Controls level when recording from microphone.

#### Stop

Applies brake to both spindles and returns all pushbuttons to Neutral.

#### Record

Moves play-record switch into record position.

#### Rewind

Returns tape rapidly to supply reel. Engages wind-rewind pulley, while disengaging take-up pulley, thus turning supply spindle.

#### Forward

Moves tape rapidly forward in play and record functions. Engages take-up pulley while disengaging wind-rewind pulley, thus turning take-up spindle.

#### Play

Starts tape moving for playback (or recording, if Record button is depressed simultaneously). Brings pressure roller and pressure pad into position against capstan and record head.

#### Trick

Depress this button and recordings can be made on previously recorded tape with no erasure.

#### External Speaker

Used for connecting external speaker for playback.

# Headphones

Plug headphones into this jack to monitor during record.

#### Output

An external amplifier may be plugged into this jack for playback,

#### Microphone Low Level

Plug microphone into this jack for microphone recordings.

#### Radio-Phono

A high level input used when recording from radio, phonograph, tuner, etc., by means of a patch cord.

# NORELCO MODELS EL3541/54B

# Threading the Tape

- 1. Place reel of tape on left spindle; empty reel on right spindle.
- Thread tape in slot with shiny side toward the front of recorder.
- 3. Insert loose end of tape into one of the slots in the empty reel and turn reel counterclockwise to take up slack in the tape.

# To Make a Recording

- 1. Plug microphone into the Low Level input jack.
- 2. Turn on the power by rotating On-Off Volume control clockwise until a click is heard. Allow sufficient time for the tubes to warm up.
- Depress the Record button and adjust the microphone level control while observing the Record level indicator. The light beams should fall within the red area of the indicator on the loudest passage.
- NOTE: The pushbuttons should be depressed firmly for proper operation. Each time the recorder is changed from one function to another, the Stop button must be depressed. If the Pause button is used, it is not necessary to depress the Stop button.
  - Hold the Record button down and depress the Play button until both are locked in the down position.
  - Hold the microphone approximately eight inches from the mouth when recording voice. Place the microphone two or three feet in front of the loudspeaker when recording from a radio, phonograph, or TV set.
  - Depress the Pause button to interrupt a recording briefly. The recorder will continue to record when the Pause button is again depressed and released.

#### Four-Track Recording

Four individual monophonic recordings can be made on the same tape. To do this, proceed as follows:

- Place the Track Selector switch in the 1-4 position.
- 2. Thread the tape as described under "Threading the Tape".
- Make a recording in this position. Track #1 will now be recorded.
- 4. Turn the tape over and make another recording. Track #4 will now be recorded.
- Place the Track Selector in the 2-3 position. Repeat Steps 3 and 4. All four tracks will now be recorded.

# To Record from a Radio, Phonograph, Tuner, or TV Receiver

Connect a patch cord from the speaker terminals of receiver being used to the High Level jack of the recorder. Proceed as outlined in Steps 2 thru 6 under 'To Make a Recording'.

#### To Wind or Rewind Tape

- Depress the Wind button and the tape will transfer rapidly from the supply reel to take-up reel.
- Depress the Rewind button and the tape will transfer rapidly from take-up reel to supply reel.
- 3. Depress the Stop button to stop the tape.

# To Play Monaural Recordings

- 1. Thread the tape.
- Depress the Play button and adjust Volume and Tone controls.

#### To Play Stereophonic Tapes

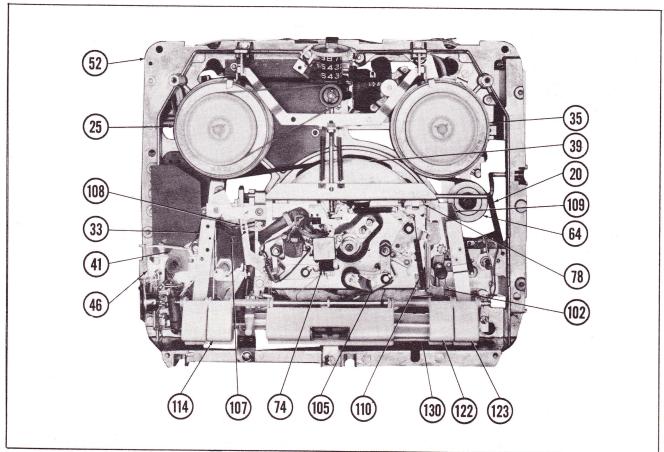
- 1. Thread the tape.
- Connect an external amplifier to the Stereo output jack.
- Connect speaker system to the external amplifier output.
- Depress the Play button. Adjust Volume control on recorder and external amplifier until a balance is maintained between the two channels.

#### To Edit and Splice Tape

- NOTE: Since one track cannot be edited and spliced without affecting the other track, recordings to be edited should be limited to one track only.
  - Tape can be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements, etc., can be inserted between selections. Unused tape can be spliced for reuse.
  - For best results, cut the tape at a slight diagonal and butt the ends together. Fasten them on the glossy side with splicing tape. Trim off any excess width.

# To Use as a Public Address System

- 1. Plug the microphone into the Microphone jack.
- Press the Public Address switch (located) on right side of recorder) until a click is heard.
- Advance the Microphone Volume control (on extreme right) to the desired level. Do not point the speaker toward the microphone as feedback will result, causing a howl in the speaker output.



TOP VIEW OF MECHANISM ( SEE PAGE 2 ALSO)

# DISASSEMBLY

- 1. Remove cabinet top cover.
- 2. Remove 3 push-on type control knobs.
- Remove 1 screw from head cover and remove cover
- Remove 4 screws from bottom of case and remove bottom cover,
- 5. Remove 4 screws from top of cabinet and 2 screws from handle. The cabinet may now be removed from the recorder assembly.

#### **ADJUSTMENT**

#### To Align Erase Head

- 1. Remove head cover (1).
- Place a tape on the supply spindle and thread as described under "Threading the Tape".
- Rotate the three mounting screws (73) so that the top of the head gap lines up with the top of the tape.

#### To Align Record-Playback Head

- 1. Remove head cover (1).
- 2. Thread a prerecorded alignment tape on recorder as described under "Threading the Tape".

#### CLEANING

Pressure roller (100), capstan (85), and recording head (69) should be cleaned occasionally of dirt and foreign matter with a soft cloth moistened with alcohol.

3. Rotate the three mounting screws (68) until maximum output is obtained.

Bias

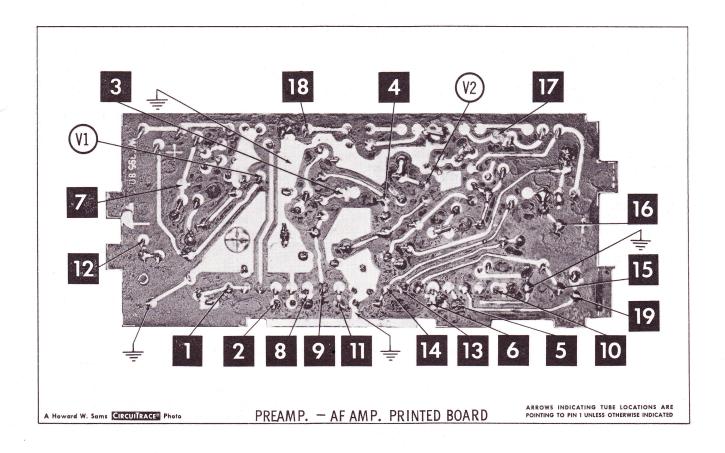
Connect a Signal generator across the Radio-Phono input jack. Adjust the generator for 1000 cycles at 6.5 millivolts.

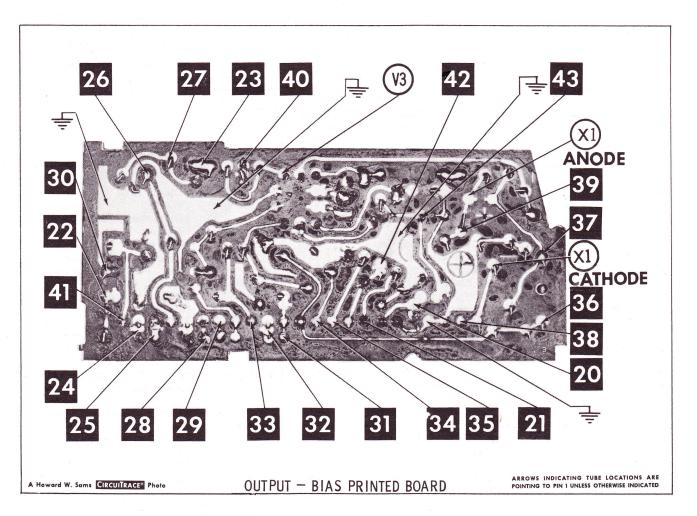
Connect a DC VTVM across R5.

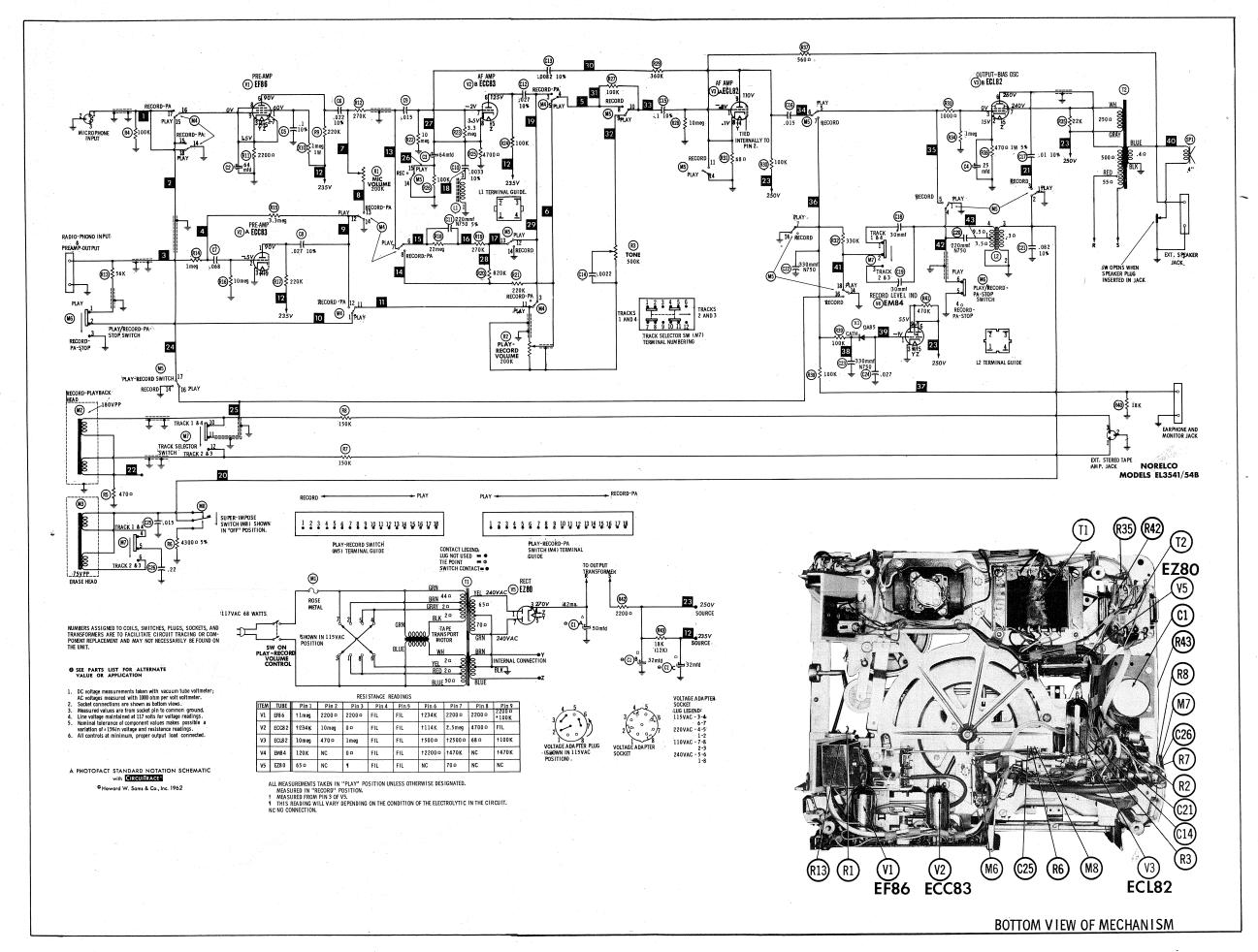
Adjust C18 and C19 for approximately 70 millivolts.

#### LUBRICATION

The recorder does not require lubrication under normal use. When disassembled for repair, wipe all bearings and sliding levers with a clean soft cloth and apply a thin coat of oil to their surfaces.







(18) (19) PHOTOFACT "EXPLODED" VIEWS © Howard W.-Sams & Co., Inc. 1962 WODERS ER3241/24B

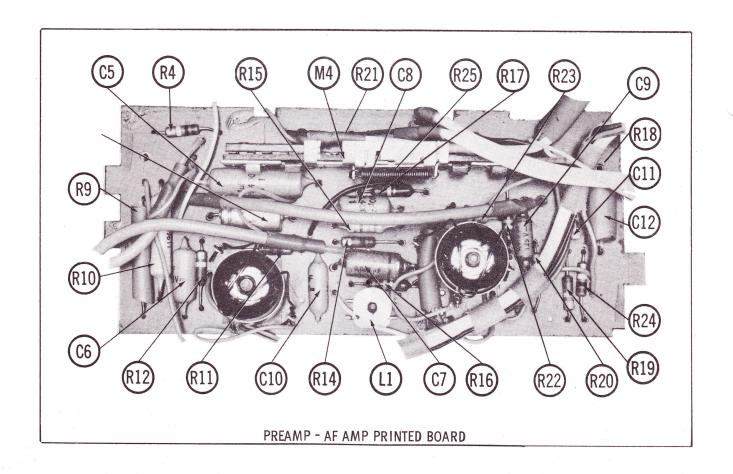
# TROUBLE CHART

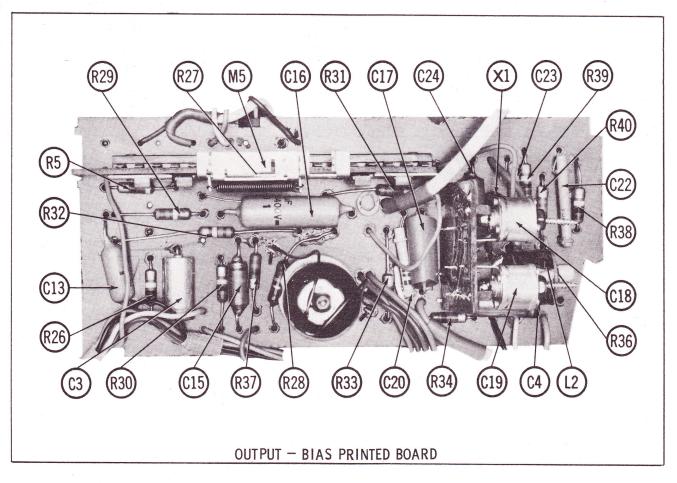
SYMPTOM	CAUSE	REMEDY
Take-up reel does not turn in Play or Record position.	l. Take-up idler spring (60) off or broken.	1. Replace take-upidler spring(60).
	<ol><li>Take-up clutch assembly slip- ping.</li></ol>	2. Reposition clutch assembly on shaft.
Take-up reel does not turn in Fast Forward position.	1. Drive belt slipping on pulleys.	l. Moisten cloth in alcohol and clean pulleys.
	2. Idler spring (60) off or broken.	2. Replace idler spring (60).
Supply reel does not turn in Rewind position.	1. Oil on idler pulley (64) or main drive pulleys.	<ol> <li>Moisten cloth in alcohol. Clean idler pulley and drive pulleys.</li> </ol>
Reels do not stop when Stop button is depressed.	1. Brake actuating spring (II) off or broken.	1. Replace brake actuating spring (11)
	2. Brake lining worn.	2. Replace brake lining.
Counter mechanism does not operate.	1. Defective counter (17).	<ol> <li>Check gear teeth in counter for damage. Replace if necessary.</li> </ol>
	2. Counter belt (16) off or broken.	2. Replace counter belt (16).
Wow or flutter.	1. Improper pressure between capstan (85) and pressure roller (100).	<ol> <li>Bend or replace pressure roller tension spring for proper tension.</li> </ol>
	2. Pressure roller (100) worn.	2. Replace pressure roller (100).
	3. Counter (17) binding.	3. Check for dirt or chips in gears. Clean and lubricate.
	4. Dirty pressure pad (74).	4. Saturate pad with alcohol. Brush surface of pad in direction of normal tape trayel.
	5. Pressure roller (100) binding on shaft or damaged.	5. Remove pressure roller (100) and clean bearing with pipe cleaner dampened with alcohol. Clean roller stud (104); if scarred, polish with crocus cloth, Apply a light coating of nonmelting grease
		to the stud before reassembling.

# MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1 2		Cover, Head	26	WT-496-04	Belt, Main Drive
2	The state of	Screw	27		Clutch Disc
3	de min	Dress Plate	28	A9-868-66	Washer
4		Knob, Volume Control	29		Driveshaft, Take-Up
5		Button, Record	30	A9-868-66	Washer
6		Knob, Volume Control	31		Screw
7		Knob, Treble Control	32		Plate, Rewind Actuating
8		Spring, Brake Guide	33		Rod, Rewind Actuating
9	PW-307-40	Bracket, Brake Assembly	34	WT-740-85	Spring, Tension
10		Nut, Brake Adjust	35	WT-882-24	Pulley, Take-Up
11	WT-740-89	Spring, Brake Tension	36	A9-868-65	Washer
12		Rod, Brake	37		Screw
13		Screw, Retaining	38		Plate, Take-Up Actuating
14		Bracket, Belt Brush	39	WT-886-94	Flywheel
15	WT-961-50	Spindle, Supply	40	- L	Ring, Retaining
16	WT-496-08	Belt, Counter Drive	41	WT-937-53	Cam, Switching
17	PW-306-00	Assembly, Counter	42		Ring, Retaining
18	WT-961-53	Spindle, Take-Up	43		Washer
19		Rod, Foot Switch Actuating	44	WT-765-56	Spring, Torsion
20	WT-740-90	Spring, Tension	45	WT-306-98	Bar, Pause Locking
21		Bracket, Head Assembly	46		Rod, Switch Actuating
22	WT-477-97	Clutch Disc	47	WT-598-33	Nut, Nylon
23	A9-868-66	Washer	48		Rod, Connecting
24	1	Driveshaft, Supply Pulley	49		Screw
25	WT-882-24	Pulley, Supply	50		Washer

Ref.	Part		Ref.	Part	
No.	No.	Description	No.	No.	Description
51	WT-001-97	Screw	92		Tape Guide
52	CONTRACTOR OF THE CONTRACTOR O	Plate, Mounting	93		Screw
53	100	Screw	94	WT-730-62	Spring, Pressure
54		Lockwasher	95	PW-306-73	Bracket, Quick Stop
55	-	Plate, Mounting	96	- 11	Nut
56	WT-277-17	Plate, Bearing	97		Washer
57	5 1	Shock Mount, Bearing Plate	98		Sleeving
58	WT-265-28	Bearing	99		Washer
59	W 1,-200-20	Rod, Take-Up Actuating	100	WT-881-66	Pressure Roller
60	WT-740-85	Spring, Tension	101	112 002 00	Washer
61	W1-140-00	Cap, Idler Shaft	102	WT-943-15	Bracket, Connecting
62	984-4		103	W 1 - 010 - 10	
63	A9-868-95	Ring, Retaining Washer	104	WT-646-12	Ring, Retaining Shaft
64	WT-881-87	Idler Wheel	105	A9-869-49	Lever, Pressure Roller
65	A9-868-95	Washer	106	110-000-10	
66	WT-882-26		107	WT-765-45	Ring, Retaining
67	W 1-002-20	Plate, Idler Wheel Bearing	108	WT-045-85	Spring, Profile
68		Plate, Mounting	109	W I =043=03	Lever, Switch
00		Screw, Record-Playback Head	110		Lever, Brake Release
69	WT-855-39	Mounting	1		Spring, Tension
70	W 1 -000-39	Head, Record-Playback	111		Spring, Tension
71	WT-730-47	Plate, Head Mounting	112		Screw
72	W 1 = 130-41	Spring, Pressure	113		Button, Fast Rewind
73		Assembly, Pressure Pad	114		Button, Pause
74	WT-856-04	Screw, Erase Head Mounting	115		Assembly, Fast Rewind Actuating
75	WT-857-01	Hum Shield and Pad Assembly	116		Assembly, Pause Actuating
76	WT-730-47	Erase Head	117	8	Bar, Stop
77	W1-130-41	Spring, Pressure	118		Spacer
78	Wm 095 70	Tie Down, Cable	119		Assembly, Stop Actuating
79	WT-035-76	Bracket, Locking	120		Spring, Stop Bar Return
80	WT-740-86	Spring, Tension	121	1	Spacer
81	WT-924-52	Nut	122		Button, Play-Record
82	WT-458-02	Tape Rest	123		Button, Fast Forward
83		Tape Guide	124	= =	Assembly, Fast Forward Actuating
84		Screw	125		Assembly, Play-Record Actuating
85		Washer	126		Shield, Lever Indicator
		Capstan	127		Bracket, Indicator Retaining
86	DIII 907 91	Set-Screw	128		Ring, Retaining
87	PW-307-21	Plate, Bearing	129		Bracket, Mounting
88	VIII 005 00	Mount, Bearing Plate	130		Bracket, Locking
89	WT-265-28	Bearing	131		Bracket, Mounting
90	WT-924-52	Nut	132		Assembly Rod, Pushbutton
91	WT-458-02	Tape Rest			





# AMP PARTS LIST AND DESCRIPTIONS

# WIRING DATA

General-use Unshielded Hook-up Wire	Use I	BELDEN	No.	8530 (Solid) Available in 12 Colors
Power Cord				8524 (Stranded) Available in 12 Colors
Power Cord	use i	BELDEN		17109 (Plastic) or 17129 (Rubber) - 9 Ft.
Power Cord (Interlock Type)	Use I	BELDEN	No.	8874 (Rubber) or 8895 (Plastic)
Low-Loss Shielded Lead (Interconnecting)	Use I	BELDEN	No. I	8401 or 8421
Phono Pick-up Arm Cable	Use I	BELDEN	No.	8430 (Two Conductor-Unshielded)
				8429 (Two Conductor-Shielded)
			1	8419 (Three Conductor-Shielded)

#### TUBES

•	AMPEREX ◆ GI	ENERAL ELECTRIC .	RC.	Α .	◆ RAYTHEON	*	SYLVANIA +
ITEM No.	USE	TYPE		ITEM No.	USE		TYPE
V1 V2 V3	Preamplifier Radio-Phono Preamp AF Amp. AF AmpOutput Bias Oscillator	EF86 ECC83 ECL82		V4 Recording Level Indicator V5 Rectifier		Indicator	EM84 EZ80

#### POWER RECTIFIERS & SIGNAL DIODES

			RECTIFIERS		DIODES		
ITEM No.	CURRENT RATING ( Measured )	ORIGINAL Part or Type No.	RCA PART No.	SARKES TARZIAN PART No.	RAYTHEON PART No.	NOTES	
X1		OA 85			3 1N126A	Record Indicator Rectifier	

# **ELECTROLYTIC CAPACITORS**

	RAT	ING			REPLA	CEMENT DATA			
No.	CAP.	VOLT.	NORELCO PART No.	AEROVOX PART No.	CORNELL- DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.
C2 C3	■32 32 64 64	350 350 350 25 25	AC5483 ① 909/C64 909/C64	AFH2-40 PRS1660 PRS1490 PRS1490	B0320 BR30-350 NLW75-25 NLW75-25	MT1-20 MT1-20	TT25X50 TT25X15 TT25X50 TT25X15		TVL2630 TVA1510 TE-1210
C4	25	25	909/C25	PTT82	NLW25-25	MT1-11	TT25X25	MLV25-25	TE-1207

① Part #A6027 used in some versions.

#### FIXED CAPACITORS

					REPLACE	MENT DATA		
No.	RATING	REMARKS	AEROVOX PART No.	CENTRALAB PART No.	CORNELL- DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25 C26	.1 400V 10% .022 400V 10% .068 125V .027 400V 10% .015 125V .023 400V 10% .220 N750 5% .027 400V 10% .0082 400V 10% .0082 400V 10% .0082 400V 10% .015 125V .1 400V 10% .01 400V 10% .01 400V 10% .01 (Nominal) .02 125V 10% .330 N750 .330 N750 .330 N750 .027 125V .015 125V .015 125V .015 125V .015 125V .015 125V .015 125V	#908/30E #908/30E	V84C4P1-10% V84C4S22-10% P288N-068 P684CM-027 P288N-015 V84C4D33-10% P684CM-0082 SI 2200 P288N-015 V84C4P1-10% V84C4S1-10% N750-SI 220 N750-SI 330 N750-SI 330 P684CM-027 P288N-015 P288N-015	DD-153	PM4P1 PM4S22 CUB4568 DPM56827 CUB6S15 PM6D33 CI0T22U DPM56827 DPM56D82 BYA10D22 CUB6S15 PM4P1 PM4S1 C10T22U DPM56S82 C10T33U C10T33U DPM56S27 CUB6S15 CUB6S15	4DP-3-104 4DP-2-223 4DP-3-683 6DP-3-273 4DP-1-153 6DP-1-332 6DP-2-822 CCD-222 4DP-1-163 4DP-3-104 4DP-1-103 CCTN-220 6DP-4-823 6DP-3-273 4DP-1-153 4DP-3-1484	GEM-1001 GEM-4168 GEM-4168 GEM-1613 GEM-16233 CN7-322 GEM-1613 GEM-16282 B-222 GEM-4115 GEM-1001 GEM-1611 CN7-322 CN7-333 GEM-1613 GEM-1613 GEM-4115	4TM-P10 4TM-S22 4TM-S68 6PS-S27 4TM-S15 6TM-D33 10TCU-T22 6PS-S27 6PS-D82 5HK-D22 4TM-S15 4TM-P10 4TM-S10

<sup>#</sup> Norelco Part Number

#### **CONTROLS**

#### All wattages 1/2 watt, or less, unless otherwise listed.

		DECICE	REPLACEMENT DATA							
No.	USE I	ANCE NORELCO PART No.		CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.			
R1 R2	Mic. Volume Play-Record Volume On-Off	200K 200K	91L/GL200K 4890000/ DL200K	*	10		U42, or(UA154A, SL3500) RU25A, SL38, US41, SL3500			
R3	Tone	500K		B-60, or (AB-60, AK-7	A47-500K-Z/ FS-3	Q13-133, or(BUI, CF25, SS1, DC1)*	U48, or (UA55A, SF-1000)			

<sup>\* &</sup>quot;SNAPTROL"

# AMP PARTS LIST AND DESCRIPTIONS (Continued)

# **RESISTORS**

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM		R	EPLACEMENT D	ATA		100	RI	EPLACEMENT D	ATA
No.	RATING	IRC PART No.	WORKMAN PART No.	REMARKS	No.	RATING	IRC PART No.	WORKMAN PART No.	REMARKS
R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17 R18 R19 R20 R21 R22 R23	100K 470Ω 4300Ω 5% 150K 150K 150K 220K 1meg 1W 2200Ω 270K 56K 1meg 3. 3meg 10meg 220K 22meg 270K 620K 620K 10meg 3. 3meg				R24 R25 R26 R27 R28 R29 R30 R31 R32 R33 R34 R35 R36 R37 R38 R39 R40 R41	100K 4700Ω 100K 100K 100H 100H 100H 68Ω 330K 1000Ω 1meg 22K 470Ω 1W 5% 560Ω 100K 100K 100K 100K			(12K) *

<sup>\*</sup> Alternate.

# COILS (RF-IF)

			REPLACE	MENT DATA			
No.	USE	NORELCO PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	Workman PART No.	NOTES
Ll L2	Choke Bias Osc.	WT56188 WT56190		-			1

# TRANSFORMER (POWER)

	RATING			REPTACEMENT DATA						
No.			NORELCO PART No.	Merit	Stancor	Thordarson	Triad	NOTES		
	PRI.	SEC. 1	SEC. 2	1 111110 111110	PART No.	PART No.	PART No.	PART No.		
Tl	117V@ .74A	480VCT a . 042A	6.3VCT a 2.1A	WT51094						

#### TRANSFORMER (AUDIO OUTPUT)

TELL	lui DED			REPL	ACEMENT D	ATA	4	
No.	IMPED	ANCE	NORELCO	Merit	Stancor	Thordarson	Triad	NOTES
	PRI.	SEC.	PART No.	PART No.	PART No.	PART No.	PART No.	
T2	6500Ω Tap ② 10%	3-4Ω	WT51096					

#### **SPEAKER**

				REPLACEME	NT DATA		
No.		TYPE		NORELCO	QUAM	NOTES	
-	SIZE	FIELD	V. C. IMP.	PART No.	PART No.	7	
SPl	4"	PM	3-4Ω	AD1400W *	4Al	* Alt. Part #940/AD1400W	

# **FUSES**

ITEM No.	TYPE	RATING	REPLACEMENT DATA						
			NORELCO PART No.		LITTELFUSE PART No.		BUSS PART No.		
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER	
MI	Rose	Metal							

# **MISCELLANEOUS**

ITEM.	PART NAME	NORELCO PART No.	NOTES
M2	Head	WT85539	Record-Playback
M3	Head	WT85701	Erase
M4	Switch	PW30610	Play/Record-PA (Spring Loaded, 2 Position Slide Type)
M5	Switch	WT88781	Play/Record (Spring Loaded, 2 Position Slide Type)
M6	Switch	WT88672	Play-Record/PA-Stop (Spring Loaded, 2 Position Slide Type)
M7	Switch	WT88767	Track Selector (Spring Loaded, 2 Position Slide Type)
M8	Switch	WT26201	Super-Impose (Spring Leaf Type)

#### **CABINETS & CABINET PARTS**

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION	
Knob Knob Knob Push Button Push Button Push Button Case	WT83269 WT26154 WT91452 WT83249 WT26163 WT26164 WT85609	Volume Tone Track Selector Record (Red) Rewind, Pause, Record-Play, Fast Forward Stop	-